

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): An IGBT with a monolithically integrated antiparallel diode, comprising:

a semiconductor substrate forming an inner zone and having a front side, a rear side, and a peripheral annular high-voltage edge;

said front side of said semiconductor substrate having semiconductor wells of a first conductivity type formed therein with transistor cells within said peripheral annular high-voltage edge, said peripheral annular high-voltage edge being provided on said front side of said semiconductor substrate;

at least one emitter region of the first conductivity type formed at said rear side of said semiconductor substrate;

at least one emitter short region of a second conductivity type integrated substantially only in a region of said high-voltage edge, said at least one emitter short region lying in a plane with said at least one emitter region and forming an

Applic. No. 10/698,082

Response Dated February 3, 2006

Responsive to Office Action of November 3, 2005

electrode of the antiparallel diode, said emitter short region
extending as far as a chip end in edge regions of the IGBT;

said at least one emitter region having no emitter short
regions within said high-voltage edge;

said at least one emitter region having a thickness of less
than 1 micrometer and a doping with a dose of between $1 \cdot 10^{12}$
and $1 \cdot 10^{15}$ charge carriers per cm^2 ;

said semiconductor wells on said front side of said
semiconductor substrate forming a counterelectrode of the
antiparallel diode; and

a distance between a point located at the center of the IGBT
and said emitter short region being maximized for triggering
the IGBT at a lowest possible current.

Claim 2 (original): The IGBT according to claim 1, wherein
said semiconductor wells at least predominantly contain
transistor cells.

Claim 3 (canceled)

Applic. No. 10/698,082

Response Dated February 3, 2006

Responsive to Office Action of November 3, 2005

~~Claim 4 (original):~~ The IGBT according to claim 1, wherein edge regions of the IGBT contain one or more emitter regions at said high-voltage edge.

Claim 5 (withdrawn): The IGBT according to claim 1, wherein said at least one emitter short regions is one of a plurality of emitter short regions.

Claim 6 (withdrawn): The IGBT according to claim 5, wherein said at least one emitter region is integrated in contiguous fashion, and said emitter short regions are integrated in insular fashion.

Claim 7 (withdrawn): The IGBT according to claim 6, wherein said emitter short regions are integrated strip-shaped emitter short regions.

Claim 8 (withdrawn): The IGBT according to claim 7, wherein said strip-shaped emitter short regions extend obliquely with respect to said high-voltage edge.

Claim 9 (withdrawn): The IGBT according to claim 7, wherein said emitter short regions are integrated annular strips.

Applic. No. 10/698,082

Response Dated February 3, 2006

Responsive to Office Action of November 3, 2005

Claim 10 (withdrawn): The IGBT according to claim 6, wherein said emitter short regions are integrated punctiform regions.

Claim 11 (withdrawn): The IGBT according to claim 10, wherein said emitter short regions form a ring of punctiform islands below said high-voltage edge.

Claim 12 (withdrawn): The IGBT according to claim 1, wherein said at least one emitter short region is integrated without alignment with respect to said transistor cells.

Claim 13 (canceled)

Claim 14 (previously presented): The IGBT according to claim 1, wherein a lifetime of minority charge carriers in said semiconductor substrate is at least 10 μ s.

Claim 15 (previously presented): The IGBT according to claim 1, wherein a thickness of said inner zone formed by said substrate is less than 200 μ m.

Claim 16 (previously presented): The IGBT according to claim 1, which comprises a field stop region of the second conductivity type integrated between a first region including

Applic. No. 10/698,082

Response Dated February 3, 2006

Responsive to Office Action of November 3, 2005

said substrate and a ~~second~~ region including said emitter region and emitter short region.

Claim 17 (previously presented): The IGBT according to claim 1, wherein said substrate forming said inner zone is weakly doped, and said emitter region is heavily doped with a significantly higher doping concentration than said inner zone.

Claim 18 (previously presented): The IGBT according to claim 1, wherein said at least one emitter region is annealed at a temperature of less than 600°C.

Claim 19 (previously presented): The IGBT according to claim 1, wherein the first conductivity type is the p-conductivity type and the second conductivity type is the n-conductivity type.

Claim 20 (withdrawn): An IGBT with a monolithically integrated antiparallel diode, comprising:

a semiconductor substrate forming an inner zone and having a front side, a rear side, and a peripheral high-voltage edge;

said front side of said semiconductor substrate having semiconductor wells of a first conductivity type formed

Applic. No. 10/698,082

Response Dated February 3, 2006

Responsive to Office Action of November 3, 2005

therein with ~~transistor cells~~ within said peripheral high-voltage edge;

at least one emitter region of the first conductivity type formed at said rear side of said semiconductor substrate;

at least one emitter short region of a second conductivity type integrated substantially in a region of said high-voltage edge, said at least one emitter short region lying in a plane with said at least one emitter region, forming an electrode of the antiparallel diode, and running obliquely with respect to said high-voltage edge; and

said at least one emitter region having no emitter short regions within said high-voltage edge; and

said semiconductor wells on said front side of said semiconductor substrate forming a counterelectrode of the antiparallel diode.